

HOJA DE EVALUACIÓN

ASIGNATURA: CÁLCULO II PARALELO A

FECHA: 18/10/2021

CARRERA:
 CIENCIAS BÁSICAS

PERÍODO DE EVALUACIÓN: SEGUNDO PARCIAL

$$\textcircled{1} \quad f(x,y) = \frac{x^2 - 9y^2}{x^2 + y^2} \quad \text{En función } f_x$$

$$f_x = \frac{2x(x^2 + y^2) - (x^2 - 9y^2)}{(x^2 + y^2)^2} \cdot 2x \Rightarrow \frac{24x^2 + 2xy^2 - 4x^3 + 18xy^2}{(x^2 + y^2)(x^2 + y^2)^2}$$

$$\Rightarrow \frac{20y^2x}{(x^2 + y^2)^2}$$

$$f_{xx} \Rightarrow \frac{20y^2 \cdot (x^2 + y^2)^2 - 20y^2x \cdot 2(x^2 + y^2) \cdot 2x}{(x^2 + y^2)^4}$$

$$f_{xx} \Rightarrow \frac{20y^2 \cdot (x^2 + y^2)^4 - 80y^2x^2(x^2 + y^2)}{(x^2 + y^2)^4}$$

$$f_{xx} \Rightarrow \frac{20y^2}{(x^2 + y^2)^2} - \frac{80y^2x^2}{(x^2 + y^2)^3}$$

$$f_{xy} = \frac{40yx - 20y^2x^2 \cdot 2(x^2 + y^2) \cdot 2y}{(x^2 + y^2)^4}$$

$$f_{xy} = \frac{40yx(x^2 + y^2)^2 - 80y^3x(x^2 + y^2)}{(x^2 + y^2)^4} \quad / \text{sol}$$

$$f_y \Rightarrow \frac{-18y^2(x^2 + y^2) - (x^2 - 9y^2) \cdot 2y + 0}{(x^2 + y^2)^2}$$

$$f_y \Rightarrow \frac{-18x^2y^2 - 18}{(x^2 + y^2)^2} - 2x^2y + 18y^3$$

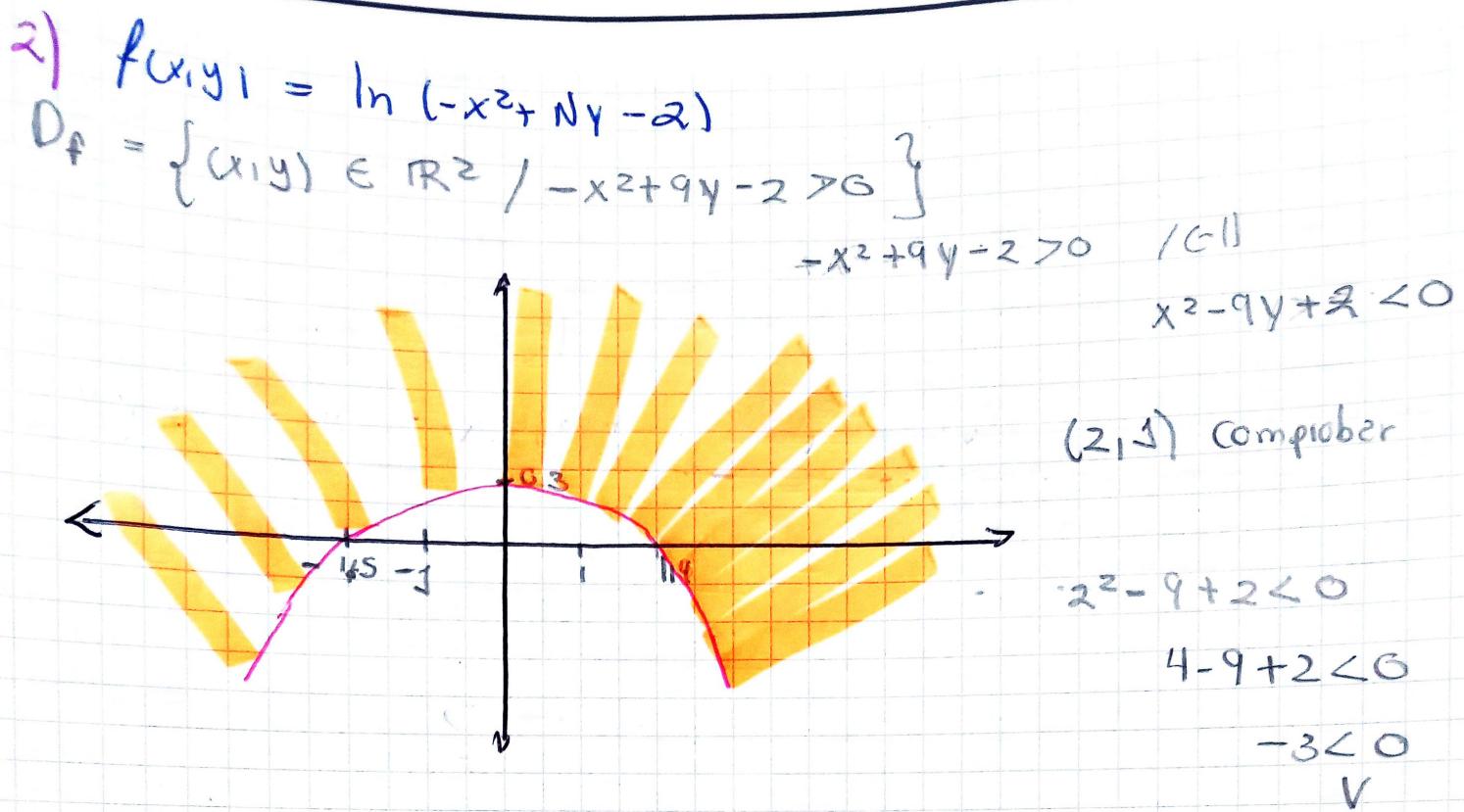
$$f_{xy} = \frac{-20x^2y}{(x^2+y^2)^2}$$

$$f_{yy} = \frac{-20x^2(x^2+y^2) + 20x^2y \cdot 2(x^2+y^2)}{(x^2+y^2)^4} = \frac{2y}{(x^2+y^2)}$$

$$f_{yy} = \frac{-20x^2(x^2+y^2) + 80x^2y^2(x^2+y^2)}{(x^2+y^2)^4} = 150$$

$$f_{yx} = \frac{-40xy(x^2+y^2)^2 + 20x^2y \cdot 2(x^2+y^2) \cdot 2x}{(x^2+y^2)^4}$$

$$f_{yx} = \frac{-40xy(x^2+y^2)^2 + 80x^3y(x^2+y^2)}{(x^2+y^2)^4} = 150$$



$$5) \cdot h(x,y) = 3x^2y + 9x^2 - 54x - 3xy - 27$$

$$h(x,y) = 27x^2y + 9x^2 - 54x - 27y - 18$$

$$\begin{cases} f_x = 54xy + 18x - 54 = 0 \\ f_y = 27x^2 + 0 - 27 = 0 \end{cases} \quad \begin{cases} f_{xy} = 54x \\ f_{yx} = 54x \end{cases}$$

$$\begin{cases} 54xy + 18x - 54 = 0 \\ 27x^2 - 27 = 0 \end{cases} \Rightarrow \begin{cases} x = 0 \\ x = \pm 1 \end{cases}$$

$$54y + 18 - 54 = 0$$

$$y = \frac{36}{54} \quad y = \frac{2}{3}$$

~~$$f_{xx} = 54y + 18$$~~

~~$$f_{yy} = 54x$$~~

$$x = -1$$

$$-54y - 18 - 54 = 0$$

$$y = \frac{72}{54} = \frac{4}{3}$$

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$$(4) \quad S = 2xy + 2xz + 2yz \quad g(x, y, z) = xyz - 9$$

$$V = xyz = 9 \text{ cm}^3$$

$$F(x, y, z, \lambda) = 2xy + 2xz + 2yz + \lambda(xyz - 9)$$

$$F_x = (x, y, z, \lambda) = 2y + 2z + \lambda yz$$

$$F_y = (x, y, z, \lambda) = 2x + 2z + \lambda xz$$

$$F_z = (x, y, z, \lambda) = 2x + 2y + \lambda xy$$

$$F_\lambda(x, y, z, \lambda) = xyz - 9$$

① con ④

$$\begin{cases} 2y + 2z + \lambda yz = 0 & ① \\ 2x + 2z + \lambda xz = 0 & ② \\ 2x + 2y + \lambda xy = 0 & ③ \\ xyz - 9 = 0 & ④ \end{cases}$$

$$2xy + 2xz = 2xy + 2yz$$

$$x = y$$

① con ②

$$2xy + 2xz = 2x^2 + 2xy$$

$$\text{reemplazo } x = y$$

$$x + x + x = 9$$

$$\sqrt[3]{x^3} = \sqrt[3]{9}$$

$$x = \sqrt[3]{9}$$

$$x = y = z = \sqrt[3]{9}$$

$$A = 2(\sqrt[3]{9})\sqrt[3]{9} + 2\sqrt[3]{9}\sqrt[3]{9} + 2\sqrt[3]{9} + \sqrt[3]{9}$$

$$A = 25,96$$



HOJA DE EVALUACIÓN

C9901-5

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PERÍODO DE EVALUACIÓN: SEGUNDO PARCIAL

$$\textcircled{4} \quad 5 = 2xy + 2xz + 2yz \quad g(x, y, z) = xyz - 9 \\ V = xyz = 9 \text{ cm}^3 \\ V = 9 \text{ cm}^3$$

$$F(x, y, z, \lambda) = 2xy + 2xz + 2yz + \lambda(xyz - 9)$$

$$F_x = (x, y, z, \lambda) = 2y + 2z + \lambda yz$$

$$F_y = (x, y, z, \lambda) = 2x + 2z + \lambda xz$$

$$F_z = (x, y, z, \lambda) = 2x + 2y + \lambda xy$$

$$F_\lambda = (x, y, z, \lambda) = xyz - 9$$

\textcircled{1} con \textcircled{2}

$$\begin{cases} 2y + 2z + \lambda yz = 0 & \textcircled{1} \\ 2x + 2z + \lambda xz = 0 & \textcircled{2} \\ 2x + 2y + \lambda xy = 0 & \textcircled{3} \\ xyz - 9 = 0 \end{cases}$$

$$2xy + 2xz = 2xy + 2yz$$

$$x = y$$

\textcircled{1} con \textcircled{3}

$$2xy + 2xz = 2x^2 + 2xy$$

$$\text{reemplazo } x = y$$

$$x + x + x = 9$$

$$\sqrt[3]{x^3} = \sqrt[3]{9}$$

$$x = \sqrt[3]{9}$$

$$x = y = z = \sqrt[3]{9}$$

$$A = 2(\sqrt[3]{9})\sqrt[3]{9} + 2\sqrt[3]{9}\sqrt[3]{9} + 2\sqrt[3]{9} + \sqrt[3]{9}$$

$$A = 25,96 \text{ cm}^3$$

